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Perception of emotion is one example of nonverbal communication and is the subject of this study of the accuracy of perception of various emotions. Seven emotions were chosen for this investigation. Each emotion was acted out by actors, whose performance was filmed. From the films, stills were selected which best represented the emotion being expressed. The purpose of the study was to determine the effects of race and sex on perception of emotion. Therefore, both expressors and perceivers were divided between Negro and white, male and female. Although the test was designed for children, the perceivers for this study were 80 undergraduate students. Each subject viewed 21 photographs of three expressors and chose from a list the emotion he thought the expressor was demonstrating. The results indicated that (1) overall accuracy of perception of emotions was not influenced by sex or race of the perciever or sex of the expressor; (2) race of expressor did affect the accuracy of perception of emotion, white expressors leading to greater accuracy of perception; and (3) some patterns of erroneously perceived emotions were related to sex of expressor and race of perceiver. (WD)

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Perception of Emotion Among Children: Race and Sex Differences

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ABSTRACT

This report describes a three phase study of children's perception of emotion investigating the patterns of accurately perceived and erroneously perceived emotions and testing the influence of sex and race differences among both perceivers and expressors.

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HEAD START EVALUATION AND RESEARCH CENTER

PERCEPTION OF EMOTION AMONG CHILDREN: RACE AND SEX DIFFERENCES*

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Much of our daily social interaction involves nonverbal communication (NVC). Although NVC is a ubiquitous phenomenon, it has not previously received the attention paid to other areas of psychology. A number of questions arise pertaining to NVC which are of considerable interest toward understanding the mechanisms underlying social interactions, whether in the classrooms, in play groups, in occupational or other settings. Is race a significant variable in perception of emotion (POE)? If there are racial subculture differences in POE, are the cross-race and same-race POEs equal to each other? Are racial differences also significant in the expression of emotion? Are they significant in influencing the patterning of both accurately and erroneously perceived emotions? Are they equal in magnitude to sex differences in POE?

This study investigates the accuracy of perception of various emotions among children, as well as the patterning of erroneously perceived emotions. It focuses on the relationship of accuracy to race and sex differences of both the expressor (the person expressing the emotion) and the perceiver (the person judging the nature of the expressed emotion). There are a number of studies dealing with NVC in general, but only a few which relate to minority group characteristics or concentrate on race and sex variables in POE.

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The most recent reviews of studies in perception, or recognition of emotion by means of NVC, are by Bruner and Tagiuri (1954), Davitz (1964), and Ekman (1965). These reviews indicate that posed photographs have been the most common stimuli used in the study of recognition of emotion by means of NVC cues. Other kinds of stimuli were utilized by various researchers, (Bruner and Tagiuri 1954), such as recording a person's voice, drawings of the human face with interchanging features, the use of people actually present, drawings of real persons, and photographs of a person accompanied by redordings of his voice.

A number of NVC studies arise out of psychiatric settings. Highly sensitive and affect-laden therapist-client interaction places heavy demands on the verbal channel, which in turn leads to the utilization of other (nonverbal) cues both for diagnosis and therapy. Mahl's (1956) investigation of the disturbances, discontinuities, and pauses of silence in the speech patterns of mental patients provides an example of such a study. He found significant correlations between these variables and the amount of anxiety present in the patient. Another study (Mahl, et. al. 1959), related gestures and bodily movements of psychiatric patients to their personality characteristics; its results indicated a significant relationship between tension and motor activity. The findings of Dittman (1962) validate those of Mahl's studies. He was able to relate hand movements to particular moods such as anger, gloom, and calm, and, although unsuccessful in relating anxiety to "linguistic" (verbal) behavior, he succeeded in discriminating between high and low conflict patients on the basis of their NVC (body movement) (Dittman and Wynne 1961).

Exline (1963), in exploring the function of visual cues, such as glances, during psychiatric interviews, found that stress inhibits eye-contact. In a replication study (Exline, et. al. 1965), his subjects, in an interview situation, evidenced substantially more eye-contact when they listened than whey they spoke. In addition, when the subject matter of the interview became embarrassing, the subject's visual contact was reduced to a minimum.

Judging minority group characteristics. Secord, Stritch, and Johnson (1960) have investigated the perception of personality characteristics through the use of nonverbal cues by offering their subjects limited stimulus information (photographs of faces). Their findings indicate that subjects tend to use some form of analogy, a "metaphorical generalization," or a bridge to fill in any information not supplied by the stimulus, and to organize all stimulus information

into meaningful structures.

Secord, Bevan, and Katz (1956) and Secord (1959) investigated Negroes and Caucasians as stimuli. The subjects rated Negroes possessing pronounced Caucasian features with, "all the characteristics of a Caucasian," when restricted to the stimulus of a photograph and believing that the person in the photograph was Caucasian. On the other hand, other subjects on being informed that the photographs were of Negroes, rated these with "all the characteristics of a Negro."

Anisfield, Bongo, and Lambert's (1962) study investigated the relationship between perception of a minority group status and ascription of certain traits to such minority group members. The same actor taped two versions of a speech. In one version he used a "Jewish" accent, while in the other he did not. Those subjects who perceived him as "Jewish" rated him lower on such variables as: height, good looks, and self-confidence, while those who saw him as "English" rated him much higher on these same variables.

Race and sex differences. Gates (1923), working with white children perceivers and white adult female expressors, found age and sex of perceiver to be significant. Kellog and Eagleson's (1931) study of Negro children perceivers and white female adult expressors confirms the significance of sex differences. However Kellog finds no difference when he compares his results to those of Gates's white children. Studies have also found sex of expressor differences to be significant. (Thompson and Meltzer 1964; Drag and Shaw 1967).

Vinacke's (1949) study used magazine pictures of Caucasians as stimuli. His results indicated that Caucasian subjects, as compared to Oriental ones, were more accurate in identifying emotions of Caucasian faces. A replication study, by Vinacke and Fong (1955) similarly indicated that Oriental subjects, as compared to Caucasian ones, were more accurate in identifying emotions expressed in photographs of Oriental faces. In both studies, the magnitude of perceivers' sex differences was greater than that of race.

METHOD

Briefly, this study:

1. Investigates patterns of children's:
   - A. correctly perceived emotionns, and
   - B. erroneously perceived emotions (i.e., those which are in fact perceived, when they are not in fact expressed), and

2. Relates POE to the:
   A. race of (1) perceiver and (2) expressor, and
   B. sex of (1) perceiver and (2) expressor.

This research was divided into three phases.

Phase 1: Production of Stimuli materials--A period during which the feasibility of the various alternatives of data collection was explored and the stimuli materials were produced.

Phase 2: Efficacy of stimuli materials--A test of efficacy of the stimuli materials on a sample of adults before administering them to samples of children.

Phase 3: Investigation of POE among children--Design of research in progress, to be completed September, 1968.

Phase 1: Production of stimuli materials

July and August (1967), were spent investigating the feasibility of various data collection alternatives, in preparing stimuli materials, and making arrangements for samples of subjects, children of both races enrolled in Headstart Centers in the Boston area. My assistant, Mr. Harvey Black, has been extremely helpful with the former, while Mrs. Sandy Alexanian, of the School of Education, Boston University, was invaluable in making contacts for the latter.

Exploratory visits were made to Headstart Centers in three areas in the vicinity of Boston: Brockton, Revere and Roxbury. Tentative arrangements have been made to use the children in all of these centers as subjects in the study.

After considerable investigation of the relative advantages of the various types of stimuli materials, I decided to use motion pictures to photograph the enactments of the various emotions.

In part, the decision to use sound motion pictures was made because of its flexibility and potential use for future research, e.g., comparisons of POE by modalities (audio-only vs. visual-only vs. audio-visual). I was also influenced by the generous offer of Dr. G. Stechler of the B.U. Medical School to use his 16 mm. sound Auricon camera.

In order to obtain the necessary number of expressors, actors from local theater companies were contacted. A series of meetings to discuss the project were held with actors, mostly members of the Harvard Summer Players and the Peoples Theatre of Cambridge.

The motion pictures were made during a series of shooting sessions. A total of 398 takes were shot using 34 actors: 6 Negro males, 7 Negro females, 10 white males and 11 white females.

A rehearsal session was held preceding each shooting. At that time, the director, Mr. Vernon Blackman of the Peoples Theatre, discussed with the actors the emotions which they were to enact. Each actor acted out seven emotions, selected for ease of portrayal by the director: anger, mirth, surprise, fear, disgust, pain and sadness. Before each take, each actor again rehearsed the specific emotion to be filmed. The actors were filmed seated, facing 45° away from the camera, as if they were interacting with another person out of the view of the camera. Black and white film was used. Retakes were shot whenever either the director or the actor were dissatisfied for any reason with the original take.

As each actor enacted a particular emotion he recited a short monologue. The monologue was the same for all actors (two sentences) and all emotions, thus maintaining the verbal (or semantic) content constant across all of the experimental treatments.

To collect a series of "candid" still pictures of the seven emotions a search of Ebony, Life, and Look was undertaken. The paucity of results of this relatively extensive search led to the decision to utilize "posed" photographs, stills made from our motion pictures. A panel of three graduate student judges examined the total foorage for each emotion of each actor and actress. In each case, the frame judged representative of the emotion was used to make the still photographs.

Thirty-two hundred feet of motion picture film (approximately 90 minutes running time) has been processed. Mr. John Geeza of Magna Films, Inc., and Mr. Ray Richardson of Film Division, Boston University, edited the film footage and made photographs of the frames selected from the motion picture films.

In the interests of balance of race and sex representation and consistency of photographic and dramatic quality, all of the motion picture material was examined. A final set comprising of emotions each for 12 males (6 white and 6 Negro) and 12 females (6 white and 6 Negro) was selected.

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Phase 2: Efficacy of stimuli materials

To manipulate both the sex and race of the expressor a new set of stimuli materials was prepared. Before administering this set of photographs to children subjects it was tested on a sample of adults in order to ascertain whether it compared in efficacy with the stimuli materials of other investigators. A copy of the text of the report of this study, submitted for presentation at the forthcoming (April, 1968) Eastern Psychological Association meetings, follows:

PERCEPTION OF EMOTION: RACE AND SEX DIFFERENCES OF EXPRESSORS AND PERCEIVERS

A 2x2x2x2 factorial study tested the effects of race and sex of perceivers (Ss, N=80), and race and sex of expressors (actors, N=24) each photographed enacting seven emotions. Race of expressors was found significant as were the patterns of both correctly and erroneously perceived emotions.

PROBLEM

Much of our daily social interaction;involves the utilization of nonverbal communication in perception of emotion. Yet a number of questions, for example, (1) Those involving the effects of such variables as sex and race of both expressor and perceiver, or (2) the patterning of both correctly and erroneously perceived emotions when the above variables are taken into account, have received scant attention.

SUBJECTS

Eighty (80) undergraduates made up the sample of perceivers (for the sex and race breakdown of the sample see the Experimental Design diagram below).

PROCEDURE

A balanced 2x2x2x2 design (below) tested the influence of the sex and race of both the expressor (the person portraying the emotion) and the perceiver (the person making the judgment as to the nature of emotion)

on perception of emotion.

The twenty four (24) expressors in this experiment were professional actors (12 white and 12 Negro, 6 male and 6 female of each race--rows #1 and 2 of the Experimental Design diagram below).

1	Race	W								N									
2	Sex of Expressor	M				F				M				F					
3	Race of Perceiver	W		N		W		N		W		N		W		N			
4	Sex of Perceiver	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
5	N (for perceivers in each treatment group)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		

w = white N = Negro m = male F = female

Black and white photographs were made of each expressor portraying seven (7) emotions: anger, happiness, surprise, fear, disgust, pain and sadness. Each photograph shows an expressor 3/4 figure, seated and at 45° angle to the camera. Lighting and background are constant for the 168 photographs.

The perceivers were the eighty (80) undergraduate Ss (40 white and 40 Negro, 20 male and 20 female of each race--rows #3 and 4 of the Experimental Design diagram). Each S was tested individually, with a set of twenty one (21) photographs (3 actors -- or actresses -- 7 emotions for each), presented in random order. After looking at each photograph the S made the judgement from a multiple choice list of the seven emotions (in alphabetical order).

RESULTS

1. Expressors and perceivers: race and sex differences

A. Neither sex nor race of the perceiver (Tables 1 and 2)* nor sex of the expressor (Table 3) influence the overall accuracy of perception of emotions.

B. Race of the expressor effects the accuracy of perception of emotion (Table 4), with higher accuracy occuring when perceiving white expressors as compared to their Negro counterparts. The extent of this influence however, is mediated by the sex and race differences of both the expressor and the perceiver. For example:

(1) While no differences were noted when overall accuracy scores were compared for perception of:

(a) white male expressors versus Negro female expressors (Table 5), and
(b) white female expressors versus Negro female expressors (Table 6),

(2) Clear differences emerge when accuracy comparisons involve:

(a) Negro male versus Negro female expressors (Table 7)
(b) white male versus Negro male expressors (Table 8), and
(c) white female versus Negro male expressors (Table (9)

2. Patterns of correct perceptions

A. The incidence of correct perception varies with emotion (Table 10)--happiness and anger giving the highest, and fear and disgust the lowest proportions of correctly perceived emotions.

B. This pattern differs (Table 11) depending on whether the expressors are male or female.

C. No differences in the pattern of correct perception of the seven emotions appear as a function of the race of the expressor

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*See the "Tables" page following Phase 2.

(Table 12) or the race and sex of the perceiver (Tables 13 and 14).

3. Patterns of erroneous perception. Erroneously perceived emotion is one, which was in fact perceived, whenever the perceiver made a mistake, that is, did not name the emotion enacted by the expressor in the photograph.

A. The incidence of erroneous perception varies with emotion (Table 15)--surprise and disgust giving the highest and pain and fear the lowest proportions of erroneously perceived emotions.

B. The pattern of correctly perceived emotions is different from that of erroneously perceived ones (Table 16).

C. The patterns of erroneously perceived emotions differ with sex of expressor (Table 17) and race of perceiver (Table 18).

D. No difference in patterns results from differences in either sex of perceiver (Table 19) or the race of expressor (Table 20).

IMPLICATIONS AND CONCLUSIONS

Sex and race differences among expressors and perceivers influence perception of emotion from posed photographs. While at times, the effects of these variables can be noted when their influence is examined independently, at other times they are significant only in interaction with each other. Similar results emerge from findings of the patterning of both correctly and erroneously perceived emotions.

Future research will hopefully answer whether the strong differences due to the race of expressor can be accounted for by white versus Negro subcultural differences in inhibiting the communication of emotions, or by such artifacts as the inability of black and white photographs to capture portrayal of emotion equally well for white and Negro expressors, or by still other alternative explanations.

TABLE 1*

	C	I	T
WP	494	346	840
NP	485	355	840
T	979	701	1680

$\chi^2 = .12$ df=1 N.S.**

TABLE 2

	C	I	T
MP	455	385	840
FP	504	336	840
T	959	721	1680

$\chi^2 = 2.74$ df=1 N.S.

TABLE 3

	C	I	T
ME	456	384	840
FE	503	337	840
T	959	721	1680

$\chi^2 = 2.30$ df=1 N.S.

TABLE 4

	C	I	T
WE	526	314	840
NE	433	407	840
T	959	721	1680

$\chi^2 = 9.03$ df=1 $p < .01$

TABLE 5

	C	I	T
WME	262	158	420
NFE	239	181	420
T	501	339	840

$\chi^2 = 2.63$ df=1 N.S.

TABLE 6

	C	I	T
WFE	269	156	420
NFE	239	181	420
T	503	337	840

$\chi^2 = 3.44$ df=1 N.S.

TABLE 7

	C	I	T
NME	194	226	420
NFE	239	181	420
T	433	407	840

$\chi^2 = 8.08$ df=1 $p < .01$

TABLE 8

	C	I	T
WME	262	158	420
NME	194	226	420
T	456	384	840

$\chi^2 = 22.18$ df=1 $p < .001$

TABLE 9

	C	I	T
WFE	269	156	420
NME	194	226	420
T	458	384	840

$\chi^2 = 23.50$ df=1 $p < .001$

*CODE

C=CORRECT I=INCORRE
M=MALE F=FEMALE
W=WHITE N=NEGRO
E=EXPRESSOR P=PERCEIV

TABLE 10 EMOTIONS***

	1	2	3	4	5	6	7	T
All P-All E	160	212	128	77	114	149	119	959

$\chi^2 = 53.22$
df=
$p < .001$

TABLE 11

	1	2	3	4	5	6	7	T
ME	75	113	47	18	69	77	57	456
FE	85	99	81	59	45	72	62	503
T	160	212	128	77	114	149	119	959

$\chi^2 = 42.77$
df = 6
$p < .001$

TABLE 12

	1	2	3	4	5	6	7	T
WE	87	114	72	49	64	73	72	526
NE	73	98	56	33	50	76	47	433
T	160	212	128	77	114	149	119	959

$\chi^2 = 6.10$
df=6
N.S.

TABLE 13

	1	2	3	4	5	6	7	T
WP	77	109	66	36	52	72	62	474
NP	83	103	62	41	62	77	57	485
T	160	212	128	77	114	149	119	959

$\chi^2 = 1.99$
df=6
N.S.

TABLE 14

	1	2	3	4	5	6	7	T
MP	78	104	62	31	51	74	55	455
FP	82	108	66	46	63	75	64	504
T	160	212	128	77	114	149	119	959

$\chi^2 = 3.23$
df=6
N.S.

TABLE 15

	1	2	3	4	5	6	7	T
Err-All P-All E	128	86	167	53	137	52	98	721

$\chi^2 = 109.36$
df=6
$p < .001$

TABLE 16

	1	2	3	4	5	6	7	T
All C	160	212	128	77	114	149	119	959
All Err	128	86	167	53	137	52	98	721
T	288	298	295	130	251	201	217	1680

$\chi^2 = 85.97$
df=6
$p < .001$

TABLE 17

	1	2	3	4	5	6	7	T
ME	80	48	82	17	92	26	39	384
FE	48	38	85	36	45	26	59	337
T	128	86	167	53	137	52	98	721

$\chi^2 = 29.40$
df=6
$p < .001$

TABLE 18

	1	2	3	4	5	6	7	T
WP	62	39	96	35	61	21	52	366
NP	66	47	71	18	76	31	46	355
T	128	86	167	53	137	52	98	721

$\chi^2 = 14.18$
df= 6
$p < .05$

TABLE 19

	1	2	3	4	5	6	7	T
MP	77	40	94	22	74	33	45	385
FP	51	46	73	31	63	19	53	336
T	128	86	167	53	137	52	98	721

$\chi^2 = 12.34$
df= 6
N.S.

TABLE 20

	1	2	3	4	5	6	7	T
WE	62	33	67	29	60	24	39	314
NE	66	53	100	24	77	28	59	407
T	128	86	167	53	137	52	98	721

$\chi^2 = 6.77$
df=6
N.S.

** All two tail tests

***CODE

(1) ANGER (4) FEAR (7) SADNESS
(2) HAPPINESS (5) DISGUST Err= ERRONEOUS
(3) SURPRISE (6) PAIN

Phase 3: Investigation of POE among children--design of research in progress to be completed September, 1968

Research Design

Race of expressor	W				N			
Race of perceiver(s)	W		N		W		N	
Sex of subject	M	F	M	F	M	F	M	F
N = (in each group)	15	15	15	15	15	15	15	15

w = white
N = Negro

M = male
F = female

Subjects. Children (age 5-6) of both races and sexes (N=120; 60 white and 60 Negro, 30 males and 30 females of each race), enrolled in Headstart programs, will be used as subjects.

Procedure. Still photographs of females (expressors) of both races will be used as stimuli materials. Each S will be asked to identify the emotion in each of 12 photographs--3 actresses, either white or Negro, depending on the treatment group, each photographed portraying 4 emotions (happiness, pain, anger and surprise). Ss will be tested individually and the order of presentation of photographs will be random for each S.

Upon being presented with a photograph the S will be asked which of the four emotions is depicted by the expressor. Because considerable amount of evidence from pretesting indicates that a five-year old's span of attention may limit his ability to keep the four alternatives (the four emotions) in mind, a training period will precede the testing session. Four comic book art type pictures will be placed on the table in front of the S, each depicting a scene typical of the four emotions. The E will explain to the S the four pictures--how each is to remind the S of each of the emotions. The pictures will remain on the table through the testing session allowing the E to refer to them. In short, they will act as graphic multiple choice alternatives.

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